GASCO Early Removal Action Construction Oversight Report

Prepared for

U.S. Environmental Protection Agency
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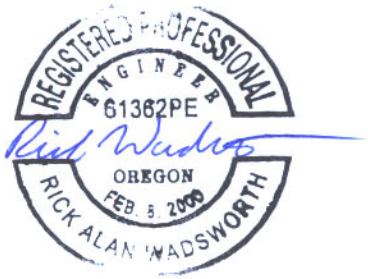
CERTIFICATION

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, whose seal, as a professional engineer licensed to practice as such, is affixed below.



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EXECUTIVE SUMMARY

On behalf of the U.S. Environmental Protection Agency (EPA), Region 10, Parametrix has prepared this Construction Oversight Report for the non-time critical early removal action conducted at the Northwest Natural (NW Natural) facility (referred to as the "GASCO site") in northwest Portland, Oregon.

This Construction Oversight Report has been prepared to document the activities conducted during the early removal action and includes a summary of oversight methods, field observations, and photographic documentation. In addition, this report includes an evaluation of selected data and other site information to provide an understanding of the issues identified by the EPA project team, which can be used to guide future early removal actions at the GASCO site or other sites within the Portland Harbor Superfund Site.

Based on observations made during oversight of the removal action and a review of site data, project documents, and other information, Parametrix provides the following conclusions and recommendations:

1. Approximately 15,300 cubic yards of tar and tar-contaminated sediment was removed during the early removal action and disposed at a Subtitle C landfill. A pilot cap was placed over the dredged area to limit future releases of contaminants and to evaluate the applicability of sediment capping technology in future removal/remedial actions at the GASCO site. The early removal action appears to have provided substantial benefit to human health and the environment by removing pure tar material and the highest concentrations of total polynuclear aromatic hydrocarbons (tPAHs) at the site. The long-term benefits, which include limiting the potential for direct exposure to contaminated material by aquatic organisms, reducing continual releases of dissolved contaminants from the tar body to the overlying water column, and limiting the potential for scour and deposition of contaminated sediment downstream, appear to outweigh the short-term impacts of the removal action. Short-term impacts include periodic exceedances of water quality criteria outside of the containment area, a limited amount of dead fish within the containment area, and the potential to have released a limited amount of contaminant mass away from the dredged area.

2. The GASCO early action provided an opportunity to the EPA project team to evaluate a number of issues raised during the project to help facilitate other remedial actions at the GASCO site or removal actions in the greater Portland Harbor Superfund Site. Since the GASCO removal action was one of the first early actions completed in the Portland Harbor, the EPA project team can use the experience gained at GASCO to provide a greater understanding of expected project concerns for dredging projects. The lessons learned from GASCO removal action should be considered in future removal actions in the Portland Harbor.

3. EPA required a relatively robust chemical monitoring program and implementation of chemical water quality criteria in the Water Quality Certification. Traditional sampling programs generally consist of field measurements, including turbidity, temperature, dissolved oxygen, and visual indicators, to assess water column impacts from dredging. The exceedances of water quality criteria during the GASCO project resulted in a number of criticisms to NW Natural and EPA from the public, environmental groups, and other entities. Based on the data collected, it is clear that the traditional field measurements would not have resulted in the perceived problems with the project. However, the criticism from the public should not discourage EPA from requiring chemical water monitoring programs. In fact, the experience at

GASCO should be used to justify additional chemical sampling in order to ensure that actual impacts to water quality are being properly assessed during early actions. The sampling program required by EPA was appropriate and effective in demonstrating the impacts to water quality from the removal action.

4. Future projects which include a chemical water quality program should include an extensive background evaluation for water quality and should be considered when establishing water quality criteria in a Water Quality Certification or other regulatory document. As observed with the GASCO project, there is potential that ambient conditions may exceed water quality criteria and may impact the ability to meet project-specific criteria. Additional background sampling would have been beneficial to evaluate the variability of ambient conditions, specifically representing various weather conditions, wave action, river flow, and upstream impacts/activities.

5. The full-length silt curtain utilized during dredging activities within the inner removal area appears to have been somewhat effective at reducing concentrations of contaminants from entering the river channel. However, the full-length silt curtain was not effective at reducing the concentrations outside the containment area to below the acute criteria established in the Water Quality Certification. For removal actions of similar contaminants and scope, additional containment technologies may be required to meet acute water quality criteria standards. Based primarily on visual observations, the full-length silt curtain appears to have contained suspended particles better than the partial length silt curtain, although no data exists to support this conclusion.

6. The partial length silt curtain utilized during dredging within the outer removal area also had some impact on water quality. Significantly lower concentrations of contaminants were observed during the outer removal operations. However, based on the data reviewed and visual indications, it appears that a significant portion of the lower concentrations detected may be attributed to the apparent flow between the partial length silt curtain and the offset bedload baffle. This gap in containment likely provided a preferential pathway for flow to occur between the contained area and the river. The lower concentrations observed downstream is likely due to dispersion and dilution of contaminants. Though water quality samples were better with the partial-length silt curtain, it appears that more contaminated particles were lost using the partial-length silt curtain than the full-length silt curtains. However, there is not sufficient data to differentiate the mass loss between the two containment systems.

7. The implementation of additional best management practices, including operational changes for dredging and material handling and installation of a barge water treatment system, resulted in an approximately 50% reduction of detected concentrations of contaminants outside the containment area.

8. Chemical water quality criteria exceedances were the primary factor in which EPA directed additional best management practices during the removal action. Other than a few minor exceedances, turbidity was not a driving factor for triggering response actions at the site. Similarly, dissolved oxygen, pH, temperature and conductivity criteria were not exceeded.

9. Although visual observations indicated that the bubble curtain may have contributed to elevated turbidity measurements, a review of the field measurement data does not support this conclusion. This may be due to the periodic nature of field sampling or the heterogeneity of the river bottom near the bubble curtain. The data indicates that turbidity was not significantly less after the bubble curtain was shut down. The most

significant impact on turbidity appears to have resulted from the change from the inner removal area to the outer removal area, which resulted in greater connection of flow between the river and the contained area.

10. It is not known whether the use of sheet pile walls would have resulted in less short-term impacts to the river than the silt curtain system. While likely controlling water quality exceedances during the dredging due to superior containment, there is potential that installation and removal of the sheet pile walls would have resulted in substantial releases. As observed throughout the GASCO project, several areas of the tar body exhibited highly mobile features and released substantial sheen at even the slightest disturbance. Further analysis would be required to fully understand the potential for water quality issues and sediment resuspension during sheet pile installation and removal. However, sheet pile containment may be a viable option for future projects, specifically for longer-term projects where the financial and logistical issues may be lessened.

11. The hydraulic dredging alternative was not considered sufficiently by NW Natural, which cited concerns with the physical condition of the tar body and other issues. It is recommended that hydraulic dredging should be considered with any future dredging projects at GASCO or other Portland Harbor sites. The significant advantages of hydraulic dredging to control potential water quality impacts may outweigh disadvantages due to financial or logistical concerns. In addition, the use of hydraulic dredging may significantly reduce the necessity of containment structures. Future dredging projects should re-evaluate this alternative, including the use of pilot tests or other means to more fully evaluate the alternative.

12. It is not known if the non-aqueous phase liquids (NAPL) observed along the shoreline cut of the removal action area is present further into the river sediment. A relatively large area of NAPL has been documented in the upland portion of the GASCO site, but has not been directly linked to in-water areas, primarily due to lack of sufficient data. The lack of observed NAPL during the tar body characterization may be associated with the sampling method or the relatively limited cores completed. The presence of NAPL, and the potential connection with the upland area should be further investigated.

13. The water quality modeling using the Kuo-Hayes model did a poor job of predicting concentrations of contaminants away from the dredge. The actual concentrations detected outside the containment area were substantially higher than those predicted, even though the model assumed that no containment would be placed. The lack of model and field correlation may be due to the presence of NAPL, insufficient number or representativeness of dredge elutriate test (DRET) samples collected, and/or deficiency in the Kuo-Hayes model to incorporate high concentrations of contaminants. Calibrating the model with actual field data may be appropriate for future actions. However, alternative models should be explored and evaluated for applicability. Based on a preliminary review, no calibrated and accepted water quality models have been identified which incorporate dredging operations with a containment component. It should be noted that pilot tests are likely to be more reliable than modeled data.

14. A total of 12 dead fish were retrieved from the primary containment area during the removal action, including one adult Coho salmon and eleven adult or juvenile non-threatened and endangered fish. No dead and/or distressed fish were observed within the outer containment area or outside the containment area during the project. The

fish take was consistent with that expected in the Biological Opinion. A total of 175 fish had been removed from the site through seining prior to the removal action. Considering that 12 dead fish (some very small) were discovered during the project, the ratio of fish removed to those potentially missed suggests that the seining was a very effective means of removing fish within the containment area, specifically considering that depths of greater than 20 feet were located in the removal areas.

15. The requirement for 72-hour laboratory analytical turnaround time and reporting to EPA was routinely not met during the project. The failure to report laboratory data in a timely manner was due to a combination of issues including, but not limited to, an increase in the number of samples collected, very low detection limits required, and the lack of project-dedicated laboratory equipment and personnel. Timely laboratory data can be critical to implementing and evaluating best management practices. Future early actions, specifically those with chemical monitoring programs that require laboratory data to make field decisions, should include specific requirements and contingencies to ensure that the agreed-upon reporting is met consistently.

16. Sediment trap information was limited during the project and appears to be inconclusive, but appears to be a viable and important method for estimating downstream impacts of dredging. EPA will consider the use of sediment traps for future removal actions to evaluate the potential loss of contaminants during a removal action. However, because of the highly variable nature of the river system and the potential impacts of in-water work to affect natural scour and depositional areas, a relatively large system of sediment traps should be deployed to be an effective measurement tool. In addition, baseline conditions should be established over a relatively long period of time to account for seasonal fluctuations, as well as the impact of tidal influences.

17. The contaminants detected in a post-construction sample collected at the offloading facility at the Port of Morrow, appears to be related to the GASCO removal action. There is not sufficient data to estimate the area of extent, but based on site observations and known activities, it is expected to be limited. In addition, based on the lack of observations of direct spills, the diligent cleanup efforts of the contractor during the offloading activities, and the time which has passed since the occurrence (11 months) and continued use of the facility by others, further evaluation or cleanup of the offloading facility does not appear to be warranted. Future removal actions should consider the importance of collecting baseline and post-construction samples from offloading facilities and/or haul routes to assess potential impacts from site activities. A statistically representative number of samples should be collected to evaluate the need for and scope of post-construction remedial actions for contaminants tracked off-site or spilled.